

WHAT IS CLAIMED IS:

1. An electrical circuit assembly comprising
a substrate,
an integrated circuit device electrically and mechanically connected to the
substrate,
5 at least one electrically conductive connecting element on one of the substrate and
circuit device,
 at least one socket on the other of the substrate and circuit device for receiving said
at least one connecting element, said socket comprising at least two resilient members
biased against said connecting element so that the circuit device and the substrate are held
10 in electrical and mechanical connection by the biasing force of the resilient members
against the connecting element.
2. An assembly as set forth in claim 1 wherein said at least one electrically
conductive connecting element is on the substrate and at least one resilient socket is on the
circuit device.
3. An assembly as set forth in claim 1 wherein said at least one electrically
conductive connecting element comprises a pin projecting from a surface of the substrate
or circuit device.
4. An assembly as set forth in claim 1 wherein said at least two resilient members
comprise opposed spring fingers electrically connected to the substrate or the circuit
device.
5. An assembly as set forth in claim 4 wherein said spring fingers have inturned
free end portions which form an opening for receiving said at least one electrically
conductive connecting element.
6. An assembly as set forth in claim 5 wherein said spring fingers are C-shaped.

7. An assembly as set forth in claim 1 wherein said at least one electrically conductive connecting element has a body with an axial length extending from a first end of the connecting element connected to the substrate or circuit device to a second free end.

8. An assembly as set forth in claim 7 wherein the body of said at least one electrically conductive connecting element is headless.

9. An assembly as set forth in claim 8 wherein said body is cylindric and of substantially uniform diameter throughout the axial length of the connecting element.

10. An assembly as set forth in claim 7 wherein said body comprises at least one shoulder that engages the resilient members of the socket to provide an interlocking force supplementing the biasing force of the resilient members to hold the circuit device and the substrate in electrical contact.

11. An assembly as set forth in claim 1 wherein said at least one electrically conductive connecting element comprises a stud bump made from metal deposited on the electrical connection pad of the substrate or circuit device.

12. An assembly as set forth in claim 11 wherein said metal is gold.

13. An assembly as set forth in claim 1 wherein said at least one electrically conductive connecting element comprises a solder ball.

14. An assembly as set forth in claim 1 further comprising a bonding agent on either of the electrically conductive connecting element or the socket to strengthen the electrical and mechanical connection between the connecting element and the socket.

15. An assembly as set forth in claim 14 wherein said bonding agent is a solder alloy.

16. An assembly as set forth in claim 14 wherein said bonding agent is a conductive adhesive.

17. An assembly as set forth in claim 1 wherein said integrated circuit device is a MEMS device.

18. An assembly as set forth in claim 1 wherein said integrated circuit device is a chip scale package.

19. An assembly as set forth in claim 1 wherein said integrated circuit device is an optoelectronic device.

20. An assembly as set forth in claim 1 wherein said substrate is a test substrate for performing testing of the integrated circuit device.

21. An assembly as set forth in claim 1 wherein said substrate is a printed circuit board for an electronic device.

22. An electrical circuit assembly comprising
a substrate,
an integrated circuit device electrically and mechanically connected to the
substrate,

5 at least one electrically conductive socket on one of the substrate and the circuit
device,

10 at least one electrically conductive connecting element on the other of the substrate
and circuit device, the connecting element comprising a body having a headless free end
that is received in said socket so that the circuit device and the substrate are held in
electrical and mechanical connection by the contact of the connecting element and the
socket.

23. An assembly as set forth in claim 22 wherein said electrical conductive connecting element comprises a pin projecting from a surface of the substrate or the circuit device.

24. An assembly as set forth in claim 22 wherein said socket comprises at least two resilient members biased against said connecting element so that the circuit device and the substrate are held in electrical and mechanical connection by the biasing force of the resilient members against the connecting element.

25. An assembly as set forth in claim 24 wherein said at least two resilient members comprise opposed spring fingers electrically connected to the substrate or the circuit device, the spring fingers having inturned free end portions forming an opening for receiving electrically conductive connecting element.

26. An electrical circuit assembly comprising
a substrate,
an electrical circuit device electrically and mechanically connected to the
substrate,
5 at least one electrically conductive socket on one of the substrate and the circuit
device,
at least one electrically conductive connecting element on the other of the substrate
and circuit device, the connecting element comprising a body having an axial surface and
at least one shoulder extending from the axial surface that is received in said socket so that
10 the circuit device and the substrate are held in electrical and mechanical connection by
contact of the connecting element and the socket.

27. An assembly as set forth in claim 26 wherein said electrical conductive connecting element comprises a stud bump projecting from a surface of the substrate or the circuit device.

28. An assembly as set forth in claim 27 wherein said stud bump comprises metal deposited on an electrical connection pad of the substrate or the circuit device.

29. An assembly as set forth in claim 26 wherein said socket comprises at least two resilient members biased against said at least one connecting element so that the circuit device and the substrate are held in electrical and mechanical connection by the biasing force of the resilient members against the connecting element.

30. An assembly as set forth in claim 29 wherein said at least two resilient members comprise opposed spring fingers electrically connected to the substrate or the circuit device, the spring fingers having inturned free end portions forming an opening for receiving said at least one electrically conductive connecting element.

31. An electrical circuit assembly comprising
a substrate,
an integrated circuit device electrically and mechanically connected to the
substrate,
5 at least one electrically conductive socket on one of the substrate and the circuit
device,
at least one electrically conductive connecting element on the other of the substrate
and circuit device, the connecting element comprising a conductive sphere deposited the
circuit device or the substrate that is received in said socket so that the circuit device and
10 the substrate are held in electrical and mechanical connection by the contact of the solder
ball and the socket.

32. An assembly as set forth in claim 31 wherein said socket comprises at least two resilient members biased against said connecting element so that the circuit device and the substrate are held in electrical and mechanical connection by the biasing force of the resilient members against the connecting element.

33. An assembly as set forth in claim 32 wherein said at least two resilient members comprise opposed spring fingers electrically connected to the substrate or the circuit device, the spring fingers having inturned free end portions forming an opening for receiving said at least one electrically conductive connecting element.

34. An assembly as set forth in claim 31 wherein said conductive ball comprises a solder sphere.

35. An assembly as set forth in claim 31 wherein said conductive ball comprises a conductive adhesive.